REMARKS

The Examiner's Action dated May 31, 2005, has been received, and its contents carefully noted.

In order to more clearly define the contribution of the invention over the prior art, independent claims 14, 32 and 33 have been amended to specify that the armor assembly is constructed to provide protection against oncoming regular and armor piercing firearm projectiles. Support for the added limitation will be found in the Specification, as filed, at page 1, first paragraph.

The rejection presented in section 3 of the Action is traversed for the reason that the novel armor assembly defined in the rejected claims is not suggested by any combination of the teachings of the applied references. For the sake of good order, it is noted that the rejection is stated as being applied against claims 14-31, although claims 32 and 33 are also pending. In view of the specific reference to claims 32 and 33 on page 3 of the Action, it will be assumed that it was intended to include those claims in the statement of the rejection.

In order to further advance prosecution, submitted herewith is a signed Declaration by one of the inventors providing a detailed explanation of why those skilled in the art would consider the present claims to be obvious under 35

USC §103(a) in view of any combination of the teachings of the applied references. Consideration of this Declaration is requested. The Declaration was not earlier submitted because it was believed that the arguments previously presented clearly established the patentable distinctions between the present invention and the applied references. In view of the Examiner's adherence to the rejections, it was considered that a declaration presenting factual information was necessary.

The signed declaration was noted to contain an error in the first paragraph on page 6 in that it refers to page 222 of the application, rather than of the attached article. For this reason, there is also attached hereto a corrected, but unsigned, declaration.

The following discussion relates to points that are also discussed in the accompanying Declaration.

One patentable distinction between the pending claims and any combination of the teachings of the applied references resides in the recitation in each of claims 14, 32 and 33 that the armor assembly provides protection from oncoming regular and armor piercing firearm projectiles. As explained at the bottom of page 5 of the accompanying Declaration, Fischer does not disclose a laminate that is suitable for providing protection against armor piercing projectiles. This is one reason why one skilled in the art

would not consider modifying the explosive attenuating structure of Blommer in accordance with the teachings of Fischer when the purpose is to provide protection against armor piercing projectiles.

Furthermore, the armor assembly according to the present invention distinguishes patentably over the teachings of the applied references by the recitations in claims 14 and 33 that at least one armor layer of the front panel of the assembly is "slantingly oriented relative to the expected trajectory of the oncoming projectile", and the recitation in claim 32 that the plurality of plates of the front panel of the assembly are "slanting in respect of the expected trajectory of said oncoming projectile".

With respect to these limitations, the action states: "the Examiner is equating Fischer's teaching of disposing the first ply in the direction of an expected impact to Applicant' armor layer that is **slantingly oriented**" (emphasis added). It is submitted that his is not a justifiable conclusion since no logical basis exists for such a view.

When it is stated that a surface of any type is disposed in a given direction, the usual and ordinary meaning of this statement would be that the surface is oriented to be perpendicular to that direction. There is no reason to

believe that anyone would understand such a statement to mean that the surface is slanted with respect to the stated direction.

Thus, the phrase in Fischer "first ply, which is disposed in the direction of an expected impact" would not be understood by anyone, skilled in art or not, to mean that the ply is slanted; rather it would be understood to mean that the ply is facing the impact:

a. The word "disposed" is consistently used to refer to the relative positions of the various plies, and not inclination;
b. The order of the plies is non-symmetric and important for ballistic response, therefore a person skilled in the art needs to know which way to position the laminate. The only words that may teach this are "disposed in the direction". Therefore, those words do not indicate an orientation.
c. Slanting and material deflection properties are not mentioned in the examples contained in the Fischer reference. In addition, the stated test conditions imply a perpendicular orientation of the plates, and there is no mention in the reference of a departure from standard practice.
d. Fischer did not teach only one ply as slanted, contrary to the Examiner's assertion, this is not consistent with the concept of a laminate - one layer cannot be

slanted with respect to the others.

Therefore, if there is slanting it must mean Fischer slanted the entire laminate, and the reference would then not suggest that only one ply is slanted.

e. Therefore "disposed in the direction" cannot mean a slanting orientation.

Stated in other terms, it is clear that Fischer only intended to indicate which ply would face the expected impact.

In order to combine the references and to maintain Blommer's "laminate structure" (col. 3, line 48), a slantingly oriented first ply would cause the entire structure in Blommer to be slanted. However, Blommer teaches away from a slanted structure for at least the following reasons:

The attenuating structure in the Blommer reference comprises a "design specifically suitable for the close environments found in missile storage containers and inside missiles"(column 2, line 29), wherein the "principal objective of the present invention [is] to provide…[a] thinner, lighter structure". This would not be achieved by providing a slanted armor layer that by definition increases the space needed for the armor;

"the direction from which the first accidental explosion will come is unknown" (col. 4, lines 51-54). Therefore slanting at an advantageous angle is impossible; and

"a novel explosive attenuator is described which is <u>particularly suitable</u> for use between mass-detonable explosives, and for the <u>close environment found in missile storage containers and inside missiles</u>" (col. 2, lines 44-48). Slanting the attenuator would require more space, which would defeat Blommer's intention to provide

an attenuator that is designed to be used for protection in places with limited space.

In the Response to Arguments, it is asserted that combining the references would be obvious because "Fischer et al. *specifically* disclose that disposing the **first ply** in the direction of an expected impact provide a ballistic response that is unexpectedly high" (col. 3, line 21-23)(emphasis added).

Applicants strongly dispute this characterization of the Fischer disclosure for the reason that Fischer does not teach that **a first ply** provides a "ballistic response that is unexpectedly high". What Fischer actually states is that "[t]he ***three*** plies ***cooperate*** to provide a ballistic response that is unexpectedly high". (col. 3, line 23-24). Hence, the Examiner's above-quoted assertion is not supported by the references and does establish a justifiable motivation to combine the references.

Applicants also disagree with the Examiner's assertion that Blommer et al disclose the claimed invention, except for the teaching that the armor layer or plate is slanted.

Specifically, it is submitted that Blommer does not disclose an armor layer that is made of PMMA or epoxy resin.

According to the Examiner's own admission the structure in Blommer comprises:

> "a center sheet of steel surrounded by aluminum, poly methyl mehtacrylate (PMMA) acrylic plastic, and a rigid foam made from a 50/50 mixture of glass microballoons and a polyurethane resin (col. 3, lines 34-40)".

The Examiner then equates the microballoons in Blommer to a brittle glass covering in the present application; and the aluminum layer in Blommer to Applicant's

rear layer, finally asserting that Blommer discloses the claimed invention, except for the slanting orientation.

The structure of Blommer, however, also comprises a center sheet of steel and a PMMA layer. Even if one presumes the Examiner meant to equate the two PMMA layers, the center sheet of steel has not been accounted for.

Furthermore, it is not mentioned in the action that Blommer's structure, "**must be** bidirectionally symmetrical about its center layer... because the direction from which the first accidental explosion will come is unknown" (col. 4, lines 51-54), i.e. that the sheets on either side of the steel sheet must be symmetrical. Therefore the presently claimed invention is of a completely different structure.

In further support of the rejection, it is asserted in the action that the motivation for providing Fischer's first ply on the Blommer assembly, would come from "the desire to create an explosion attenuating device that has increased explosion attenuation" and the alleged Fischer teaching that disposing the first ply in the direction of impact provides a ballistic response that is unexpectedly high. With regard to this assertion, the Examiner cites col. 3, lines 21-23 of Fischer, which, in fact, attributes the "unexpectedly high" ballistic response to the *cooperation between the three plies*, and not specifically to the disposition of the first ply. In fact, Fischer uses PMMA in a manner different from the present invention.

As is clear from the above-cite portion of the Fischer reference, this reference only teaches the advantage of PMMA when used in cooperation with other layers.

In contrast, the present invention is based on the discovery of special properties of PMMA and the unobvious

improvements that result from giving a layer or plates of a front ply of an assembly a slanting orientation.

Furthermore, Fischer teaches only the possibility of protecting against regular projectiles, whereas the present invention provides protection against regular projectiles and armor piercing projectiles.

It should additionally be noted that Blommer already teaches the use of a PMMA outer layer (col. 5 lines 27-28). Therefore, combining the reference teachings would not produce "increased explosion attenuation".

Regarding the rejection of claims 24 and 25, the Examiner asserts that the motivation to make the armor layer transparent or opaque would be the desire to create a laminate having a desired aesthetic appearance. The origin of such a motivation is not apparent and is not found in the prior art.

Specifically, there is no discussion in Blommer regarding appearance or a need for transparency and there is no reason to think that appearance is of any importance. Moreover, Blommer actually teaches away from having a transparent armor layer since there would have no need for the attenuator to be transparent in any of the places that Blommer mentions for use of the explosion attenuator i.e. "between mass-detonable explosives, and for the close environment found in missile storage containers and inside missiles." (col. 2, lines 46-48). Furthermore, although Blommer teaches a PMMA outer layer (col. 5, lines 27, 28), all of the center layer examples given are opaque i.e. steel, Kevlar etc, in addition to other layers such as the aluminum.

Furthermore, Fischer teaches away from having an opaque appearance by the statements:

> "This invention relates to… transparent laminates" (col.1 lines 8-9), and

> "The present invention is embodied in a transparent laminate..." (col. 1, lines 58-59) etc.

Therefore it is hard to see what would motivate one to change the desired appearance of the assembly of either reference.

The rejection of claims 32 and 33 is based on the view that it would have been obvious to make the *PMMA layer* into a "plate" on the theory that this would provide increased explosion attenuation. No basis for this assertion has been stated and there is no evidence of prior art knowledge that such a plate would produce this advantage.

Fischer is relied upon for its disclosure of a PMMA layer and this reference consistently teaches that the PMMA layer is part of a laminate, *e.g.* "the laminate has a substantially better ballistic response than any one of the three materials by itself..."(col. 2, line 10). Therefore, this reference provides no motivation to make just one layer into a plate. Furthermore Blommer also teaches a "laminate structure" (col. 3, line 48).

In the Response to Arguments, the Examiner asserts that a plate of PMMA or epoxy resin would be obvious in the industry because "it allows the article to have enhanced flexibility". This assertion cannot possibly support the rejection because claims 32 and 33 are directed to assemblies having a front panel composed of plates or a layer made of a brittle material. It would be illogical to consider that plates or a layer of brittle material could or should be given increased flexibility.

Indeed, the present specification makes clear that the contribution of the invention resides, at least in part, in the use of brittle material. For example, the present specification states:

> "The invention is based on the surprising observation that an armor made of at least one panel of brittle... material, facing the expected path of a firearm projectile..." (page 2, third paragraph).

The explanation of the rejection further includes an acknowledgement that neither reference discloses plates. (Page 4, last two lines).

According with MPEP §2143 "To establish a prima facie case of obviousness... the prior art reference (or references when combined) must teach or suggest all the claim limitations".

Since, as acknowledged in the action, neither reference discloses a plate containing PMMA, it is clear that a proper basis for the rejection of at least claim 32 has not been established.

More generally, the Office action does not explain how the references, even when combined and modified, would provide an armor assembly that includes "a front panel composed of a plurality of plates" as claimed in claim 32.

Finally, the limitations presented in claims 17, 18, 23, 28, 30, and 31 each present added patentable limitations. These claims were not discussed at all in the action, so that there is no basis in the record for their rejection.

Accordingly, it is requested that the rejections of record be reconsidered and withdrawn, that claims 14-33 be allowed and that the application be found in allowable condition.

If the above response should not now place the application in condition for allowance, the Examiner is invited to call undersigned counsel to resolve any remaining issues.

Respectfully submitted,

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